Environmentally Preferable Power

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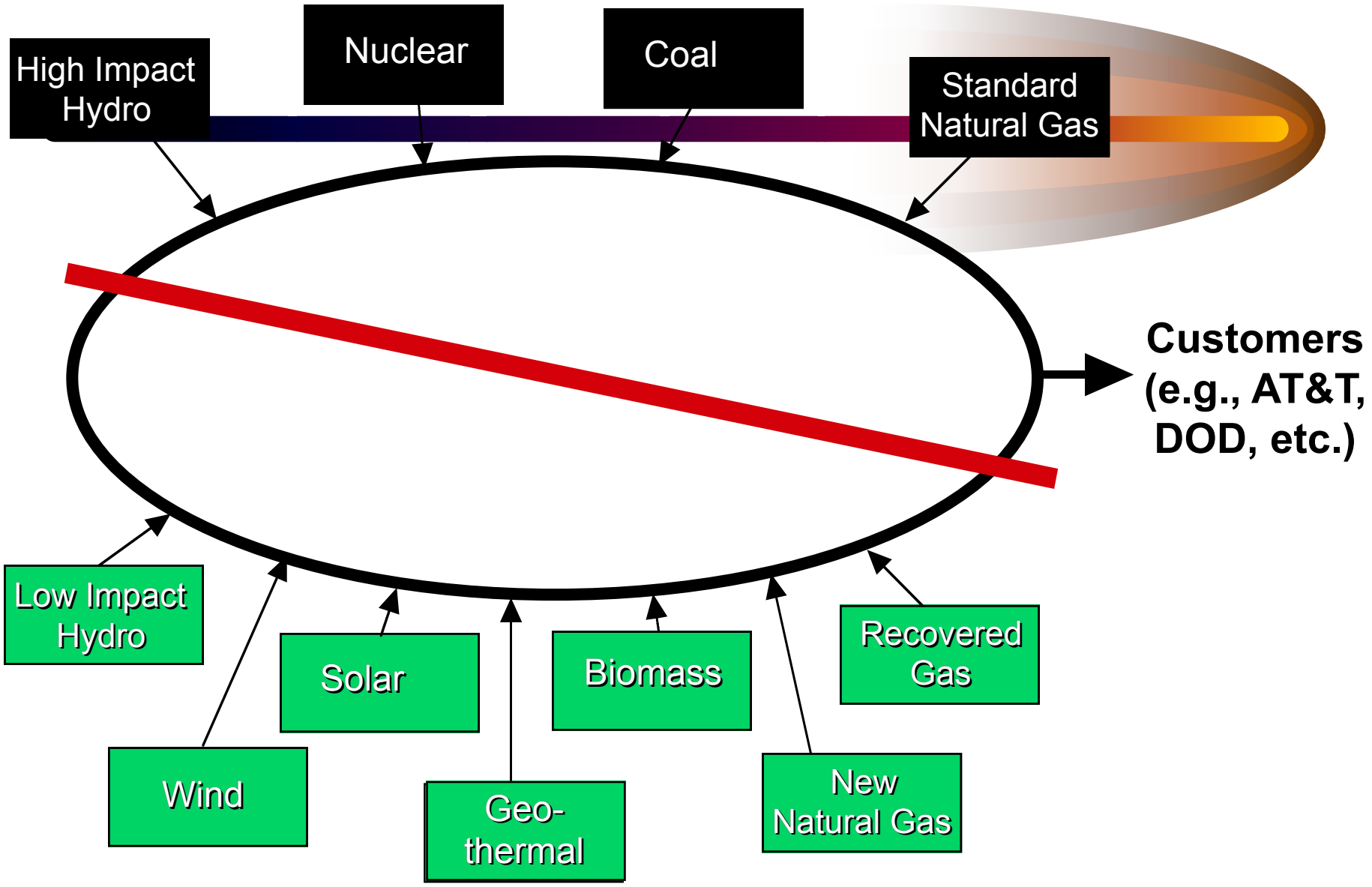
Current Eco-Certifications

- Technology-based
- Credit only non-hydro renewable sources
- Vilify coal, nuclear, large hydro
- No incentives to improve existing sources
- Ignore conservation, DG, improvements
- Do not consider source integration with grid
- No performance assessments

Traditional Certification Model for Electricity



Non-hydro "renewables" issues

- Wind – seasonal availability, habitat, birds
- Geothermal – mostly lost within 20 years
- Biomass – habitat, land use
- Solar – production, destruction wastes
- All – insufficient capacity

Environmental Preferablility

"Environmentally preferable products" – products and services that represent lower impacts on human health and the environment than competing products.

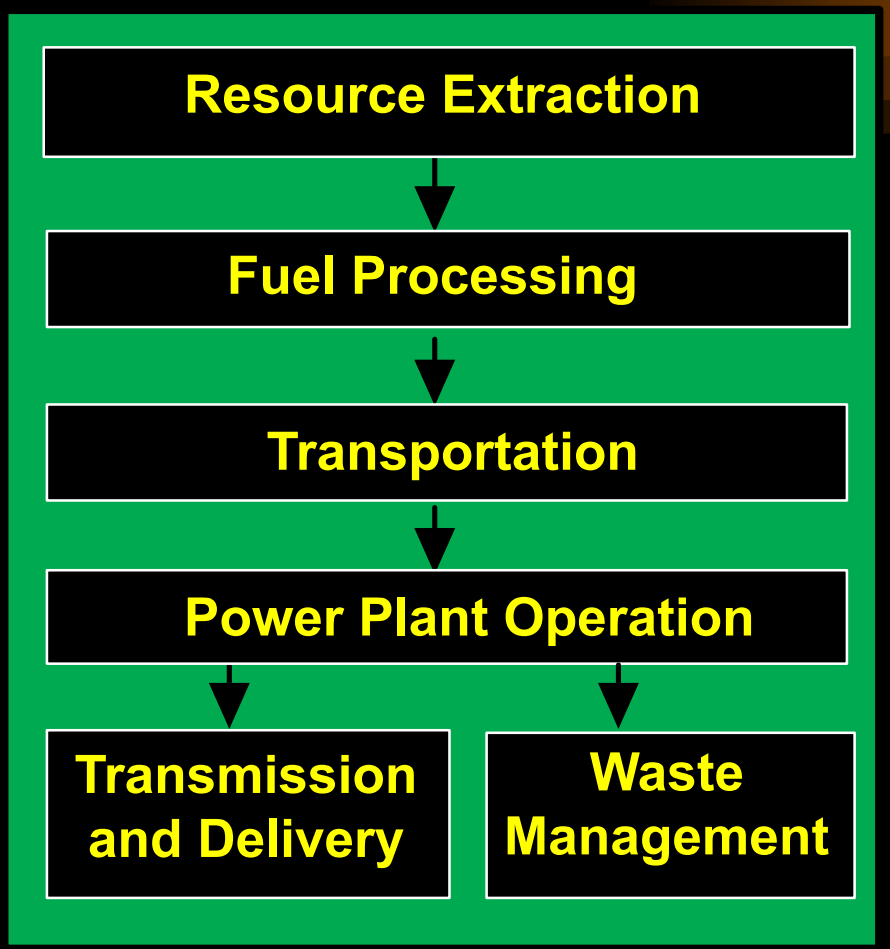
Executive Order 13101

EPA EP Purchasing Guidelines 8-20-99

EP features

- Life-cycle impact assessment – ISO 14042
- Considers full range of impacts
- Level playing field for all generation types
- Compares projects to regional average
- Captures conservation, DG, T&D upgrades
- Quantifies reductions in impacts
- Peer review

The Scope of Life-Cycle Impact Assessment (LCIA)



The Issues Addressed by LCIA

Energy Resource Depleted

Hydraulic
Biomass
Uranium
Natural Gas
Coal
Oil

Emission Loadings

Greenhouse Gases
Acidification
Ground Level Ozone (Smog)
Particulates (PM10)
Mercury
Eutrophication
Other Hazardous Chemicals (water/air)

Ecosystem Disruption

Terrestrial/Aquatic Habitats
Key Species (speciated)

Residual Hazardous Wastes

Combustion wastes
Nuclear wastes

Energy Customer's Current Environmental Performance Rating

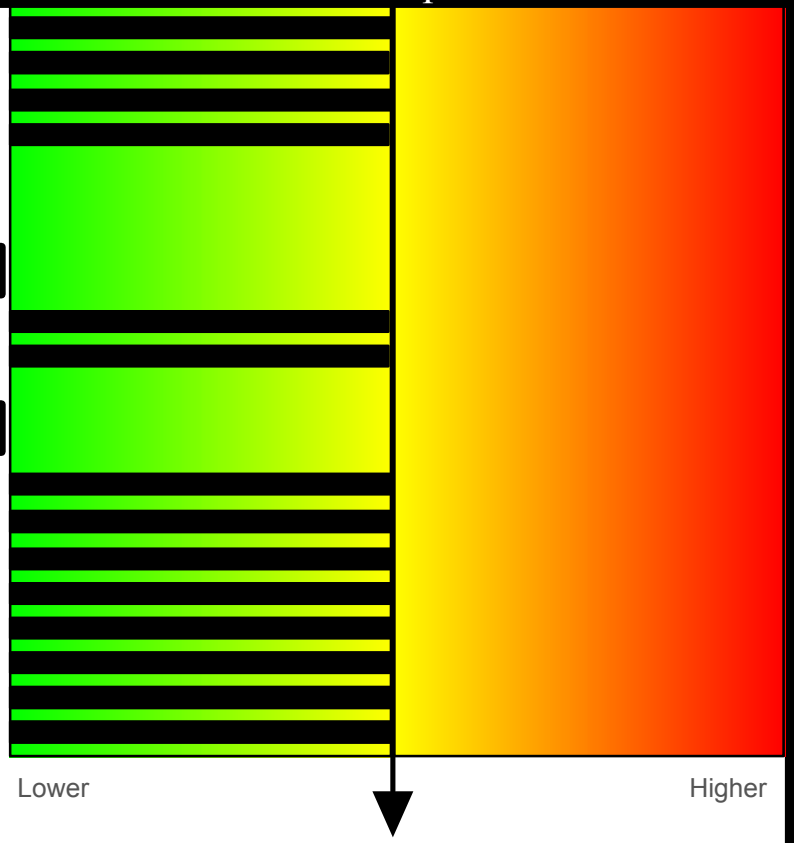
(PJM Production Pool)

Resources Depletion	Results *
Coal (toe)	200,000
Oil (toe)	2,400
Natural Gas (toe)	12,000
Uranium (toe)	166,000
Hydraulic (toe)	negligible

Ecosystem Disruption	
Terrestrial and Aquatic Habitats (eq. acres)	3,000
Key Species (% increased mortality)	TBD

Emission Loadings and Hazardous Wastes	
Greenhouse Gas (eq. tons CO_2)	2,200,000
Acidification (eq. tons SO_2)	5,900
Ground Level Ozone (eq. tons O_3)	3,400
Heavy Metals (kg)	TBD
PM10 (eq. tons)	TBD
Eutrophication (eq. tons P)	25
Priority Water Pollutants (eq. kg)	TBD
Hazardous Waste - RCRA (eq. tons)	TBD

toe = tons of oil equivalents; eq. = equivalent



* Based on 2,500 GWh annual purchases

Customer's Current EPR Baseline (PM)

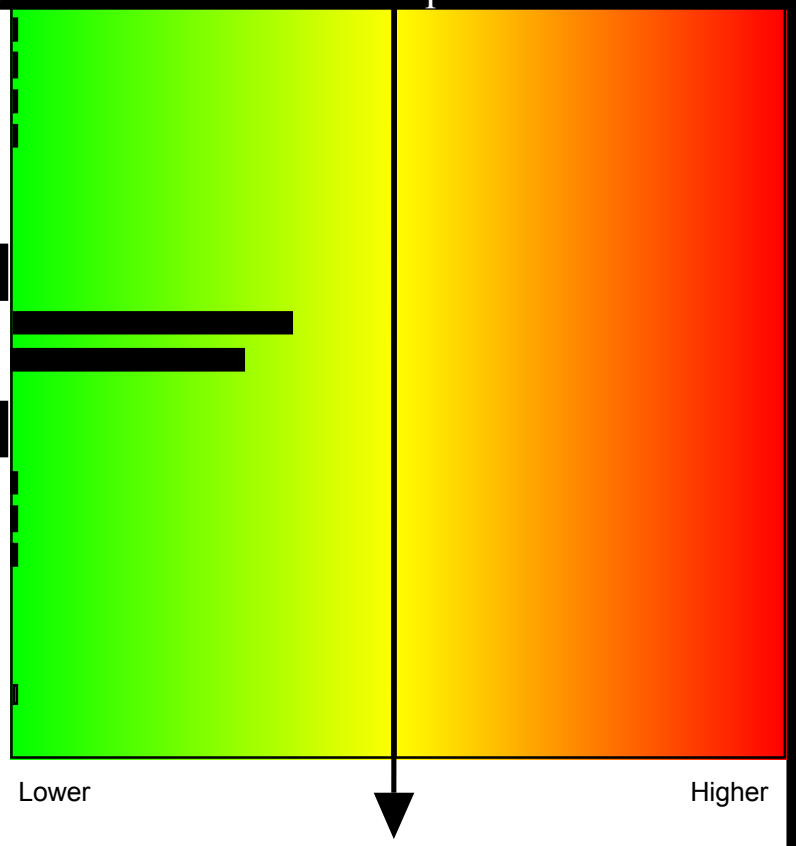
Environmental Performance Footprint

based on results of a Life-Cycle Impact Assessment

Safe Harbor Hydropower — Conestoga, Pennsylvania

Resources Depletion	Results *
Coal (toe)	102
Oil (toe)	159
Natural Gas (toe)	118
Uranium (toe)	1
Water Resources (eq cu. m^3)	negligible
Mineral Resources (tons)	negligible
Ecosystem Disruption	
Terrestrial and Aquatic Habitats (eq. acres)	1130
Key Species- Amer. Shad (% increased mortality)	27%
Emission Loadings and Hazardous Wastes	
Greenhouse Gas (eq. tons CO_2)	1689
Acidification (eq. tons SO_2)	0.5
Ground Level Ozone (eq. tons O_3)	0.3
Title III Hazardous Air Pollutants (eq. kg)	negligible
Eutrophication (eq. tons P)	negligible
Priority Water Pollutants (eq. kg)	negligible
Hazardous Waste - RCRA (eq. tons)	124

toe = tons of oil equivalents; eq. = equivalent



* Based on 1100 GWh annual production

Average PJM Impacts (1997)

LCIA of Glen Canyon Dam

- Demonstration project for large hydro
- Environmental constraints 1,300 to 800 Mw
- Count dam construction and maintenance
- In-depth focus on habitats and species
- NGO in study design and results review
- Available for public review
- Will display true costs of capacity losses

Rational Energy Choices

- Comprehensive cradle-to-grave performance assessment independent of technology
- Model into power grid
- Compare to power system average
- Increase energy supply
- Demonstrate environmental responsibility